

ABSTRACT OF THE DISCLOSURE

The present invention is directed to a method for polymerizing olefins in a multi-stage polymerization apparatus including a gas-phase polymerization reactor in a subsequent stage. By use of the present method, the composition of gas in the gas-phase reactor is easily adjusted, and moreover, a polymer having an intended composition is produced in a consistent manner. In one aspect, the method for polymerizing olefins is performed in successive, multiple stages by use of a plurality of polymerization reactors disposed in series which include at least one gas-phase polymerization reactor after a first reactor, wherein a multi-component gas is removed from a gas-phase reactor and pressurized and/or cooled to thereby liquefy a portion of the gas; at least a portion of gas is discharged; and the remaining gas and the liquid are returned to the gas-phase reactor.